

# **LONG BEACH AIRPORT**

## **PASSENGER ACTIVITY FORECAST AND FACILITY REQUIREMENTS ANALYSIS SUMMARY**

In recent years growth in passenger activity at Long Beach Airport (LGB) has been dramatic, over 300% since 2001, putting a strain on existing airport facilities, particularly the terminal, holdroom, baggage claim, and passenger and baggage screening facilities. While future growth will be severely limited by the current Noise Ordinance – which restricts the number of daily flights into and out of the airport – growth in passenger traffic could occur within the parameters of the Ordinance. This growth in passenger activity will require specific improvements to the existing facilities to provide a reasonable level of service to the public using LGB.

In order to understand and plan for this inevitable growth, a forecast and facility requirements studies were undertaken to estimate future passenger traffic and quantify needed facility improvements. The study began with the development of a passenger activity forecast, including an estimate of peak hour average day peak month passenger traffic generated by a likely future aircraft arrival and departure schedule. Then, future facility requirements were estimated based on industry standard facility planning factors, city codes, and compared to the existing facilities to determine what additional facilities will be needed.

The study is documented in three reports: Flight Activity Analysis, Passenger Activity Forecast and Facility Requirements Analysis. Each report presents in detail the analysis, methodology, assumptions and conclusions. The reports were prepared by the City of Long Beach's airport consultant HNTB, and Mestre Greve Associates, which understand the unique operational characteristics of LGB as well as the aviation industry at large.

Forecasts were developed for two scenarios. Scenario 1 assumes that LGB continues to operate with current set restrictions, and at the existing allowable minimum daily level of 41 commercial and 25 commuter flights. Passenger projections based on average day peak and peak month activity resulted in an annual enplanement projection of 2.1 million (4.2 million annual passengers, or MAP). Scenario 2, based upon optimization of the aircraft fleet mix and reductions in nighttime operations, assumes that an additional six to eleven daily commercial flights could operate without exceeding the airport's noise budget yielding 2.5 million annual enplanements (5.0 MAP).

Consultants were directed to provide the Scenario 2 forecast for information purposes only, and to only develop terminal facility recommendations to accommodate the lesser activity of Scenario 1.

The reports represent the consultant's best judgment of future passenger traffic and required facilities at LGB. Actual growth and facility needs could vary from those anticipated due to unforeseen circumstances or changes in the aviation industry.

## **Appendix A**

### **LONG BEACH AIRPORT FLIGHT ACTIVITY ANALYSIS REPORT**

Prepared by  
Mestre Greve Associates  
May 14, 2004

This report provides the results of an analysis to determine the realistic number of flights that could be accommodated under the Long Beach Airport Noise Budget if airlines used an optimized fleet and reduced the number of nighttime operations.

The assumptions used to develop this analysis are based on realistic assumptions about the fleet and time of operation as opposed to an idealized fleet with no night operations. In this context, realistic was defined according to the following rules:

1. Each airline will continue to operate in its current market. For example, Jet Blue would continue to operate primarily to the east coast (with high operating weights) with some flights to short destinations (with low operating weights). The important aspect of this assumption is that Jet Blue will not switch into a short haul carrier, only serving Oakland, Las Vegas, Phoenix and the like.
2. For each airline the fleet used at Long Beach will be the quietest aircraft that is currently in their fleet or the airline has firm orders to acquire that aircraft. In other words, airlines will only fly aircraft they currently own or are committed to purchase.
3. The nighttime noise budget penalty for operations between 10 pm and 7 am is significant. In 2003, there were 415 night operations over RMT 9 and 251 night operations over RMT 10 during the 2003 budget year, 10/1/02 through 9/31/03. For purposes of this analysis it was assumed that airlines would reduce their night operations by 50% from 2003 levels. Due to weather, air traffic and security delays; it is inconceivable that the airlines will achieve perfection and eliminate all night flights. The purpose of using an assumption of a 50% reduction in night operations is to determine the effect of this dramatic drop in night operations on the number of additional flights that can be accommodated.
4. If the fleet mix and number of night operations are optimized such that more than 41 flights can be accommodated at Long Beach, the number of additional flights will depend on how many of the new flights occur during the evening and night hours. The more of the new flights that occur during the evening (7 pm to 10pm) and night hours (10 pm to 7am), then the fewer number of new flights that could be added. For purposes of this analysis, it was assumed that all new flights will be distributed throughout day according to the present distribution of flights, with

reduced night operations. Specifically, based on the 2003 budget year, 28% of any new flights will occur during the evening hours (7 pm to 10 pm) and 1.7% will occur at night (10 pm to 7 am). Note that the 1.7% night operations reflects a 50% reduction from the actual level of night operations flown in budget year 2003 (3.3%) to reflect the previous assumption of a 50% improvement in night operation levels.

**Fleet Mix Assumption By Airline:** The following aircraft substitutions were made to optimize the fleet mix according the rules outlined above:

- ❑ American Airlines exchanges all of their MD80 operations for B737-800 aircraft.
- ❑ Federal Express exchanges all B727 aircraft for A300 aircraft.
- ❑ Jet Blue exchanges one-third of their A320 aircraft for E190 aircraft (this assumption is high towards the E190 relative to the assumption that Jet Blue continues to serve primarily east coast destinations, however, the E190 may be used on some domestic long haul flights and therefore was included here to ensure that a future scenario in which Jet Blue moves many E190s into Long Beach is accounted for).

**Resulting Additional Potential Flights:** The number of potential additional flights beyond the base 41 flights is dependent on the type of aircraft that is added and whether that aircraft is flown heavy (long haul destination) or flown light (short haul destination). Table 1 shows the sensitivity of the number of additional flights to aircraft type and the time of the flight.

**Table 1 - Number of Potential Additional Flights\* By Aircraft Type**

	Base Aircraft**	Heavy A320	Average A320	B737-800
New flights 28% evening and 1.7% night	6.4	7.6	11.3	7.8

\* Beyond the minimum 41 daily flights allowed in the budget

\*\* Base aircraft in the budget is defined as an aircraft that produces a noise exposure of 65 CNEL for 100 daytime flights.

Table 1 shows that the number of potential new flights is sensitive to the aircraft type. For example, if the new flights are a heavy A320 (east coast destination) then there is the potential to have 7.6 additional flights, but there may be as many as 11.3 additional flights if the A320 is flown at a lighter weight, i.e., to a closer destination. The City of Long Beach would have to allocate any additional flights based on a commitment to operate specific aircraft types and destinations.

Table 3

## LONG BEACH AIRPORT

## Passenger Terminal Facility Requirements Comparison

Description	Scenario 1 Requirements from Table 1		Scenario 2 Requirements from Table 2		Approximate Existing Areas		Comments on Existing Areas
	No./LF	SF	No./LF	SF	No./LF	SF	
<b>Airline Functions</b>							
Ticket Counter Area		1,928		1,928		1,250	
Ticket Counter Length	184		184		140		
Ticket Counter Queuing		2,762		2,762		1,400	
Airline Ticket Office		4,603		4,603		4,360	includes Airline Operations
Baggage Claim Area		9,666		10,683		4,380	exterior covered space
Baggage Claim Frontage	376		415		215		two claim devices
Baggage Service Office		900		995		0	
Outbound Baggage		11,967		11,967		10,400	includes EDS/TSA
Inbound Baggage		7,518		8,309		3,400	exterior covered space
Airline Operations		10,000		11,853		0	included in ATO
Departures Lounges (Holdrooms)	11	19,350	13	23,150	8	12,850	three holdroom buildings
B757-200	2	4,500	2	4,500	2		
A320	5	10,250	6	12,300	4		
B737-700	1	1,750	2	3,500	1		
CRJ-700	3	2,850	3	2,850	1		
<b>Subtotal Airline Functions</b>		<b>68,693</b>		<b>76,249</b>		<b>38,040</b>	
<b>Concessions</b>							
Concessions (food/ bev/ sundry)		21,276		25,220		5,460	
Concessions storage		4,255		5,044		0	
<b>Subtotal Concessions</b>		<b>25,531</b>		<b>30,264</b>		<b>5,460</b>	
<b>Secure Public Area</b>							
Passenger Screening Checkpoint		9,100		9,100		5,900	two checkpoints
Concourse Circulation		16,500		19,500		2,450	
Restrooms		5,484		5,601		3,200	
Other		2,128		2,522		0	
<b>Subtotal Secure Public Area</b>		<b>33,212</b>		<b>36,723</b>		<b>11,550</b>	
<b>Non-Secure Public Area</b>							
Circulation - Ticketing		5,523		5,523		1,400	
Circulation - Baggage Claim		7,518		8,309		4,200	exterior covered space
Circulation - General		24,374		27,000		10,140	includes exterior space
Restrooms		3,656		3,734		1,330	
Other		2,128		2,522		0	
<b>Subtotal Non-Secure Public Area</b>		<b>43,199</b>		<b>47,088</b>		<b>17,070</b>	
<b>Non-Public Area</b>							
EDS/ TSA		9,574		9,574		0	included in Outbound Baggage
Airport Administration		9,750		10,800		6,970	
Loading Dock		800		800		0	
Restrooms		1,800		1,800		430	
Circulation		9,750		10,800		4,100	
Maintenance and Storage		4,875		5,400		3,700	
Mechanical/ Electrical		24,374		27,000		1,570	
Other (chases, structure, etc.)		12,187		13,500		3,200	
<b>Subtotal Non-Public Area</b>		<b>73,110</b>		<b>79,673</b>		<b>19,970</b>	
<b>Total Functional Area</b>		<b>243,745</b>		<b>269,998</b>		<b>92,090</b>	includes 30,130 SF of exterior space

Source: HNTB analysis

SF = Square Feet; LF = Linear Feet

Table 1

## LONG BEACH AIRPORT

## Historical Passenger and Aircraft Operation Activity at Long Beach Airport

Year	Passenger Enplanements			Operations					
	Air Carrier	Regional Carrier	Total	Air Carrier	Regional Carrier	Cargo	General Aviation	Military	Total
1981 (a)	101,574	13,181	114,755	6,132	3,518		580,647	1,590	591,887
1982 (a)	218,008		218,008	n/a	n/a	n/a	461,287	n/a	476,455
1983 (a)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
1984 (a)	530,148	11,527	541,675	8,380	17,926		420,649	2,253	449,208
1985 (a)	551,789	5,019	556,808	7,930	9,878		370,313	1,519	389,640
1986 (a)	564,894		564,894	12,771			395,655	2,129	410,555
1987 (a)	611,332		611,332	20,202			414,459	2,489	437,150
1988 (a)	564,460	27,835	592,295	17,757	7,735		410,980	3,131	439,603
1989 (a)	645,985	47,550	693,535	22,722	6,946	226	432,987	2,749	465,630
1990 (a)	712,913	25,514	738,427	23,848	3,386	3,930	463,886	2,332	497,382
1991 (a)	675,552	9,691	685,243	24,696	6,126		406,222	2,281	439,325
1992 (a)	419,953	1,834	421,787	15,318	3,328		415,182	2,148	435,976
1993 (a)	298,541	9,060	307,601	12,260	2,366		414,284	1,994	430,904
1994 (b)	205,030		205,030	9,648	610		476,457	1,598	488,313
1995 (b)	111,170		111,170	7,266	3,282		462,675	3,493	476,716
1996 (b)	121,349		121,349	8,145	4,968		462,609	1,642	477,364
1997 (b)	260,210		260,210	9,360	4,932		434,677	1,543	450,512
1998 (b)	304,891	6	304,897	11,104	6,608		452,034	1,837	471,583
1999 (b)	302,798	77	302,875	14,964	6,602		475,364	2,160	499,090
2000 (b)	304,422	17,668	322,090	12,140	6,111		360,135	1,013	379,399
2001 (b)	278,086	56	278,142	9,488	7,378		340,897	745	358,508
2002 (b)	678,807	9,720	688,527	16,434	8,349		325,313	817	350,913
2003 (c)	n/a	n/a	1,437,852	28,410	7,347		302,075	975	338,807

(a) Airports Council International, North American Airport Traffic Report.

(b) USDOT T-100 data for passengers; FAA ATADS data base for aircraft operations. Air cargo operations included in air carrier category.

(c) Long Beach Airport. Total passengers divided by 2. Operations data from FAA ATADS data base.

Sources: As noted and HNTB analysis.

Table 2

## LONG BEACH AIRPORT

**Origin-Destination Traffic and Average Fares: Los Angeles Metropolitan Area and LGB**  
**Twelve Months Ending September 2003**

Market	Airport Code	Origin-Destination Passengers				Average Fare	
		Metro Area		LGB		Metro Area	LGB
		Total	Percent	Total	Percent		
Metropol Oakland CA	OAK	4,092,940	8.4%	482,950	19.0%	62.82	52.04
McCarran Intl NV	LAS	3,044,690	6.2%	215,430	8.5%	54.51	43.97
Sky Harbor Intl AZ	PHX	2,218,020	4.5%	31,000	1.2%	60.82	72.15
Sacramento Metro CA	SMF	2,165,820	4.4%	150	0.0%	68.66	143.59
San Jose Muni CA	SJC	2,138,750	4.4%	-	0.0%	68.23	-
John F Kennedy In NY	JFK	2,095,150	4.3%	810,410	31.9%	226.02	154.59
Seattle/Tacoma In WA	SEA	1,950,230	4.0%	74,160	2.9%	120.95	117.25
O'Hare Intl IL	ORD	1,550,180	3.2%	32,220	1.3%	155.46	117.51
Honolulu (Intl)	HNL	1,194,420	2.4%	-	0.0%	176.50	-
Denver Intl CO	DEN	1,132,350	2.3%	6,660	0.3%	149.84	137.77
Newark Intl NY	EWB	1,125,820	2.3%	4,670	0.2%	209.99	239.84
Portland	PDX	1,113,880	2.3%	4,220	0.2%	110.11	116.69
Dallas/Ft Wor Int TX	DFW	1,097,860	2.2%	19,805	0.8%	180.12	175.10
San Francisco In CA	SFO	1,097,760	2.2%	-	0.0%	111.56	-
Salt Lake Intl UT	SLC	1,060,280	2.2%	89,790	3.5%	81.55	61.65
Wm B Hartsfield GA	ATL	1,010,260	2.1%	86,730	3.4%	167.87	115.83
Dulles Intl DC	IAD	806,850	1.6%	251,040	9.9%	244.07	142.39
Logan Intl MA	BOS	709,910	1.4%	5,440	0.2%	219.30	205.09
Wayne County MI	DTW	678,860	1.4%	10,120	0.4%	162.14	140.78
Baltimore/Wash Intl	BWI	658,950	1.3%	3,360	0.1%	152.33	198.37
Philadelphia Intl PA	PHL	624,490	1.3%	5,000	0.2%	195.39	226.85
Orlando Intl FL	MCO	612,660	1.3%	4,930	0.2%	166.94	214.13
St Paul Intl MN	MSP	610,970	1.2%	4,480	0.2%	181.04	181.85
George Bush Intc TX	IAH	586,570	1.2%	8,110	0.3%	184.21	196.41
Kahului, Maui	OGG	586,930	1.2%	-	0.0%	181.64	-
Other		15,001,300	30.6%	386,965	15.2%	-	-
Total		48,965,900	100.0%	2,537,640	100.0%	132.05	121.94

Sources: USDOT Origin-Destination Survey and HNTB analysis.

Table 3

## LONG BEACH AIRPORT

Hourly Distribution of Activity: Average Day Peak Month  
Scenario 1

	Aircraft Operations			Passengers			Percent Distribution		
	Arrivals	Departures	Total	Deplanements	Enplanements	Total	Deplanements	Enplanements	Total
0000-0059	-	-	-	-	-	-	0.0%	0.0%	0.0%
0100-0159	-	-	-	-	-	-	0.0%	0.0%	0.0%
0200-0259	-	-	-	-	-	-	0.0%	0.0%	0.0%
0300-0359	-	-	-	-	-	-	0.0%	0.0%	0.0%
0400-0459	-	-	-	-	-	-	0.0%	0.0%	0.0%
0500-0559	-	-	-	-	-	-	0.0%	0.0%	0.0%
0600-0659	-	4	4	-	493	493	0.0%	7.4%	3.7%
0700-0759	1	7	8	148	714	862	2.2%	10.7%	6.5%
0800-0859	2	1	3	206	148	354	3.1%	2.2%	2.7%
0900-0959	6	4	10	637	427	1,064	9.6%	6.4%	8.0%
1000-1059	4	7	11	472	<b>785</b>	1,257	7.1%	<b>11.8%</b>	9.4%
1100-1159	6	5	11	530	529	1,059	8.0%	7.9%	7.9%
1200-1259	1	3	4	60	265	325	0.9%	4.0%	2.4%
1300-1359	3	2	5	368	117	484	5.5%	1.8%	3.6%
1400-1459	5	3	8	538	370	908	8.1%	5.5%	6.8%
1500-1559	2	5	7	208	538	746	3.1%	8.1%	5.6%
1600-1659	4	1	5	479	148	627	7.2%	2.2%	4.7%
1700-1759	4	6	10	367	729	1,096	5.5%	10.9%	8.2%
1800-1859	4	3	7	325	176	501	4.9%	2.6%	3.8%
1900-1959	6	3	9	739	265	1,004	11.1%	4.0%	7.5%
2000-2059	5	2	7	627	208	835	9.4%	3.1%	6.3%
2100-2159	<b>8</b>	5	<b>13</b>	<b>964</b>	755	<b>1,719</b>	<b>14.5%</b>	11.3%	<b>12.9%</b>
2200-2259	-	-	-	-	-	-	0.0%	0.0%	0.0%
2300-2359	-	-	-	-	-	-	0.0%	0.0%	0.0%
Total	61	61	122	6,667	6,667	13,333	100.0%	100.0%	100.0%
Peak Hour	8	7	13	964	785	1,719	14.5%	11.8%	12.9%
Peak 60 Minutes	9	10	14	1,074	1,083	1,828	16.1%	16.2%	13.7%

Sources: Appendix B and HNTB analysis.

Table 4

## LONG BEACH AIRPORT

**Hourly Distribution of Activity: Average Day Peak Month  
Scenario 2**

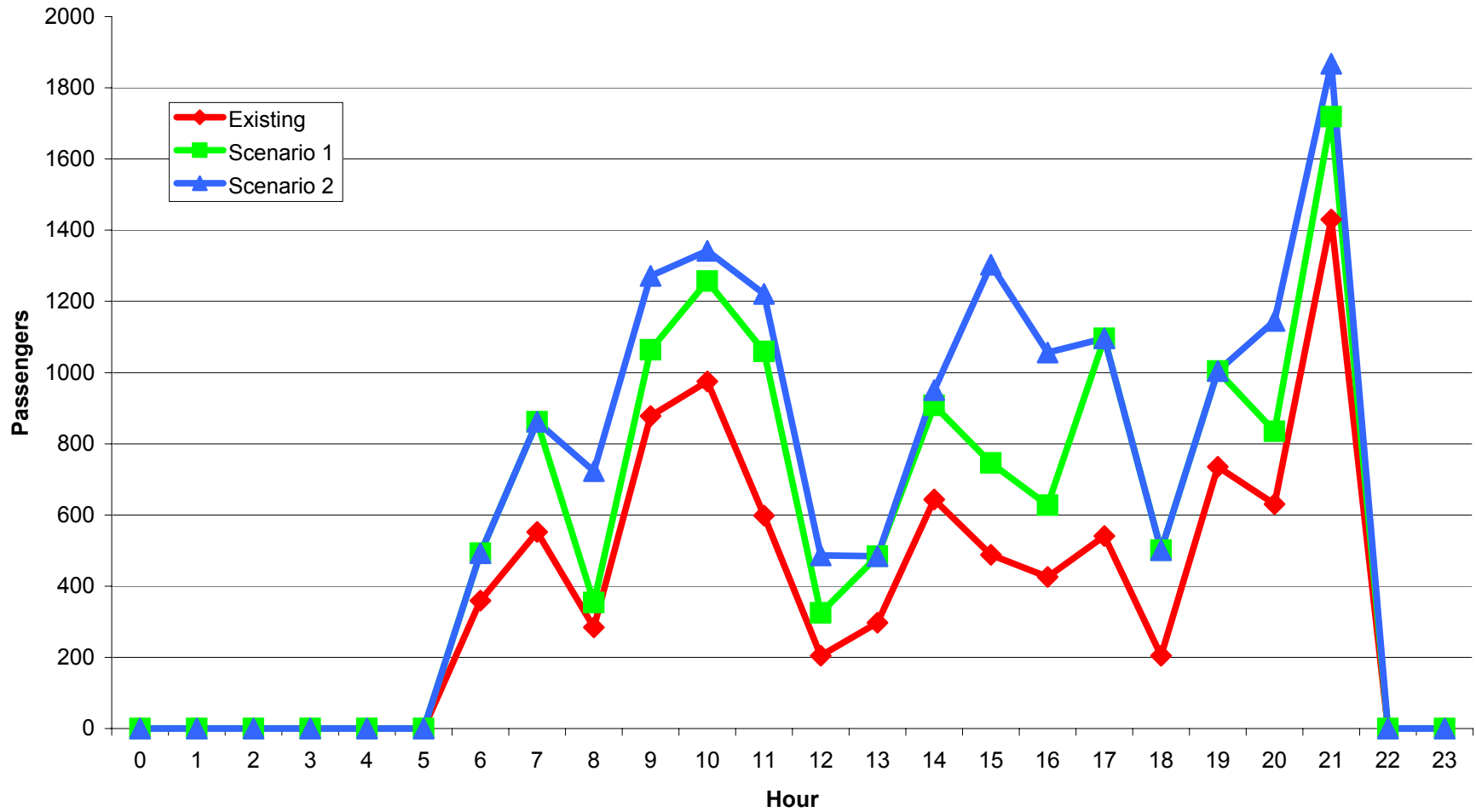
	Aircraft Operations			Passengers			Percent Distribution		
	Arrivals	Departures	Total	Deplanements	Enplanements	Total	Deplanements	Enplanements	Total
0000-0059	-	-	-	-	-	-	0.0%	0.0%	0.0%
0100-0159	-	-	-	-	-	-	0.0%	0.0%	0.0%
0200-0259	-	-	-	-	-	-	0.0%	0.0%	0.0%
0300-0359	-	-	-	-	-	-	0.0%	0.0%	0.0%
0400-0459	-	-	-	-	-	-	0.0%	0.0%	0.0%
0500-0559	-	-	-	-	-	-	0.0%	0.0%	0.0%
0600-0659	-	4	4	-	493	493	0.0%	6.2%	3.1%
0700-0759	1	7	8	148	714	862	1.9%	9.0%	5.5%
0800-0859	3	3	6	265	458	723	3.4%	5.8%	4.6%
0900-0959	6	6	12	637	635	1,272	8.1%	8.0%	8.0%
1000-1059	4	7	11	514	<b>828</b>	1,342	6.5%	<b>10.5%</b>	8.5%
1100-1159	7	5	12	692	529	1,221	8.8%	6.7%	7.7%
1200-1259	1	4	5	60	427	487	0.8%	5.4%	3.1%
1300-1359	3	2	5	368	117	484	4.7%	1.5%	3.1%
1400-1459	5	3	8	581	370	951	7.4%	4.7%	6.0%
1500-1559	5	6	11	620	683	1,303	7.8%	8.6%	8.2%
1600-1659	5	4	9	538	518	1,056	6.8%	6.6%	6.7%
1700-1759	4	6	10	367	729	1,096	4.6%	9.2%	6.9%
1800-1859	4	3	7	325	176	501	4.1%	2.2%	3.2%
1900-1959	6	3	9	739	265	1,004	9.4%	3.4%	6.4%
2000-2059	7	2	9	937	208	1,145	11.9%	2.6%	7.2%
2100-2159	<b>9</b>	5	<b>14</b>	<b>1,112</b>	755	<b>1,867</b>	<b>14.1%</b>	9.5%	<b>11.8%</b>
2200-2259	-	-	-	-	-	-	0.0%	0.0%	0.0%
2300-2359	-	-	-	-	-	-	0.0%	0.0%	0.0%
Total	70	70	140	7,903	7,903	15,806	100.0%	100.0%	100.0%
Peak Hour	9	7	14	1,112	828	1,867	14.1%	10.5%	11.8%
Peak 60 Minutes	9	10	14	1,187	1,083	1,867	15.0%	13.7%	11.8%

Sources: Appendix C and HNTB analysis.

**Figure 1**

LONG BEACH AIRPORT

**Hourly Distribution of Passengers**



**Table 5**

## LONG BEACH AIRPORT

**Comparison of Scheduled Seat Departure Distribution by Time of Day  
West Coast Airports (a)**

<b>Hour</b>	<b>Scheduled Seat Arrivals</b>									
	<b>Long Beach Scenario 1 (b)</b>	<b>Long Beach Scenario 2 (c)</b>	<b>Burbank</b>	<b>Spokane</b>	<b>Oakland</b>	<b>Ontario</b>	<b>Portland</b>	<b>San Diego</b>	<b>San Jose</b>	<b>Orange Cty</b>
Peak Hour Percent	14.6%	14.1%	15.5%	13.3%	11.2%	14.0%	8.3%	11.7%	10.3%	11.8%
<b>Hour</b>	<b>Scheduled Seat Departures</b>									
	<b>Long Beach Scenario 1 (b)</b>	<b>Long Beach Scenario 2 (c)</b>	<b>Burbank</b>	<b>Spokane</b>	<b>Oakland</b>	<b>Ontario</b>	<b>Portland</b>	<b>San Diego</b>	<b>San Jose</b>	<b>Orange Cty</b>
Peak Hour Percent	11.6%	10.4%	15.6%	12.3%	13.3%	14.8%	13.8%	11.6%	14.8%	10.7%
<b>Hour</b>	<b>Scheduled Seat Arrivals and Seat Departures</b>									
	<b>Long Beach Scenario 1 (b)</b>	<b>Long Beach Scenario 2 (c)</b>	<b>Burbank</b>	<b>Spokane</b>	<b>Oakland</b>	<b>Ontario</b>	<b>Portland</b>	<b>San Diego</b>	<b>San Jose</b>	<b>Orange Cty</b>
Peak Hour Percent	12.7%	11.6%	12.3%	9.5%	7.9%	10.8%	8.2%	9.7%	9.8%	9.1%

(a) Schedule for August , 2003. Excludes operations by Southwest Airlines.

(b) Appendix B.

(c) Appendix C.

Sources: Official Airline Guide as compiled by BACK Aviation Solutions and HNTB analysis.

**Table 6**

## LONG BEACH AIRPORT

**Summary of Activity Projections  
Scenario 1 and 2**

	Existing (a)	Scenario1	Scenario 2
<b>Enplanements</b>			
Peak 20 Minutes	615	802	802
Peak 60 Minutes	769	1,083	1,083
Average Day Peak Month (ADPM)	4,623	6,667	7,903
Peak Month (b)	143,313	206,677	244,993
Annual (c)	1,475,298	2,127,581	2,522,015
<b>Deplanements</b>			
Peak 20 Minutes	452	591	680
Peak 60 Minutes	911	1,074	1,187
Average Day Peak Month (ADPM)	4,623	6,667	7,903
Peak Month (b)	143,313	206,677	244,993
Annual (c)	1,475,298	2,127,581	2,522,015
<b>Total Passengers</b>			
Peak 20 Minutes	833	937	937
Peak 60 Minutes	1,634	1,828	1,867
Average Day Peak Month (ADPM)	9,246	13,333	15,806
Peak Month (b)	286,626	413,354	489,986
Annual (c)	2,950,595	4,255,163	5,044,030
<b>Passenger Aircraft Flights (ADPM)</b>			
Air Carrier	35	36	45
Regional Carrier	-	25	25
Total	35	61	70
<b>Gate Requirements</b>			
757	2	2	2
Other Narrow Body (d)	8	6	8
Regional Jet	-	3	3
Total	10	11	13
<b>Aircraft Parking Requirements (e)</b>			
757	3	4	5
Other Narrow Body (d)	7	8	10
Regional Jet	-	4	4
Total	10	16	19

(a) Based on April 2004 schedule and assuming peak month load factors. Gate and aircraft parking requirements are requirements based on the airline schedules and do not necessarily correspond to existing availability.

(b) Average day peak month multiplied by 31 days.

(c) Peak month passengers multiplied by ratio of annual days to peak month days and ratio of annual load factor to peak month load factor.

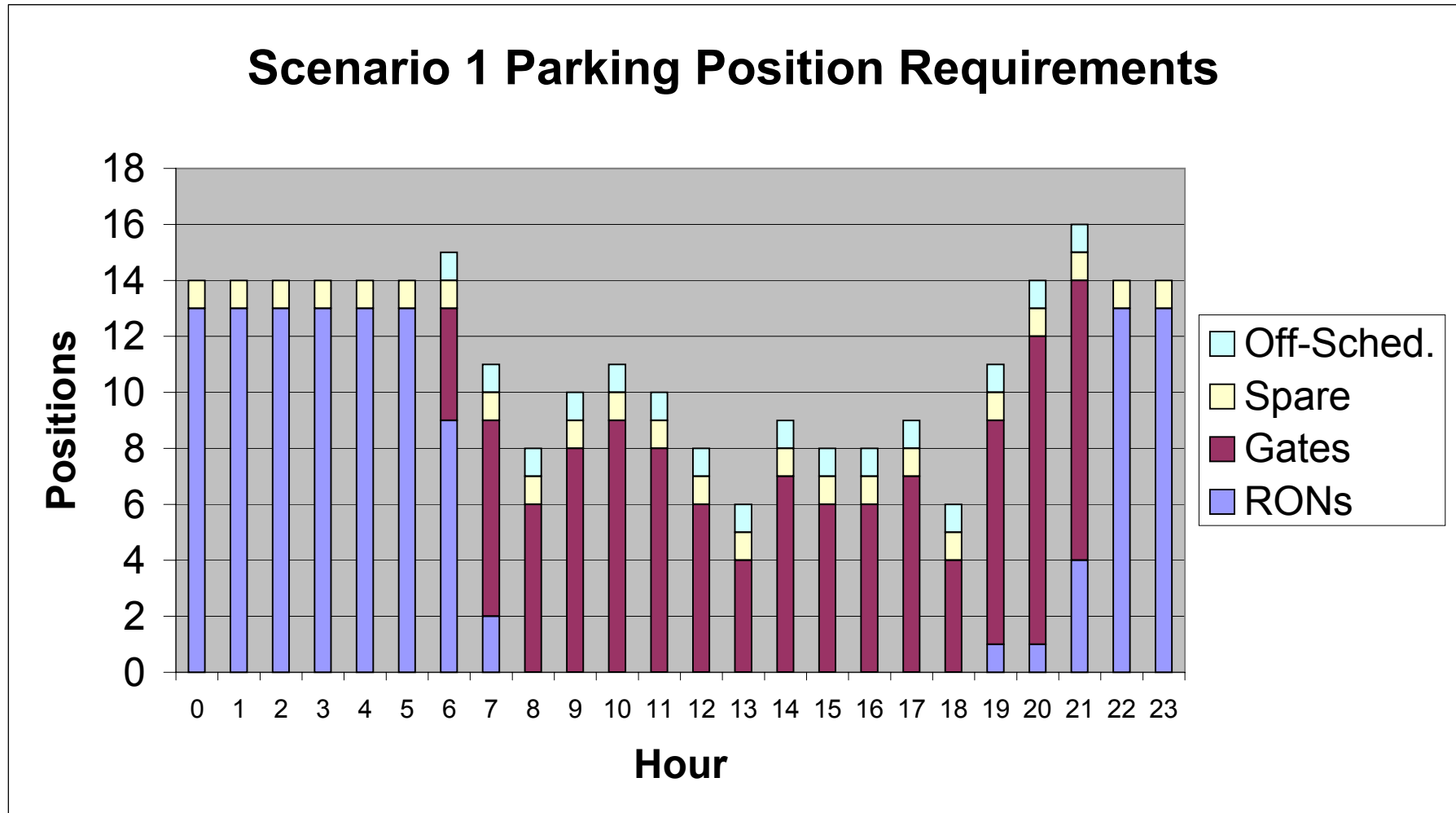
(d) Canadair 900s included with narrow body aircraft.

(e) Includes overnight parking positions and allowance for one spare parking position and an additional position to accommodate off-schedule aircraft.

Sources: Appendix B, Appendix C and HNTB analysis.

Figure 2

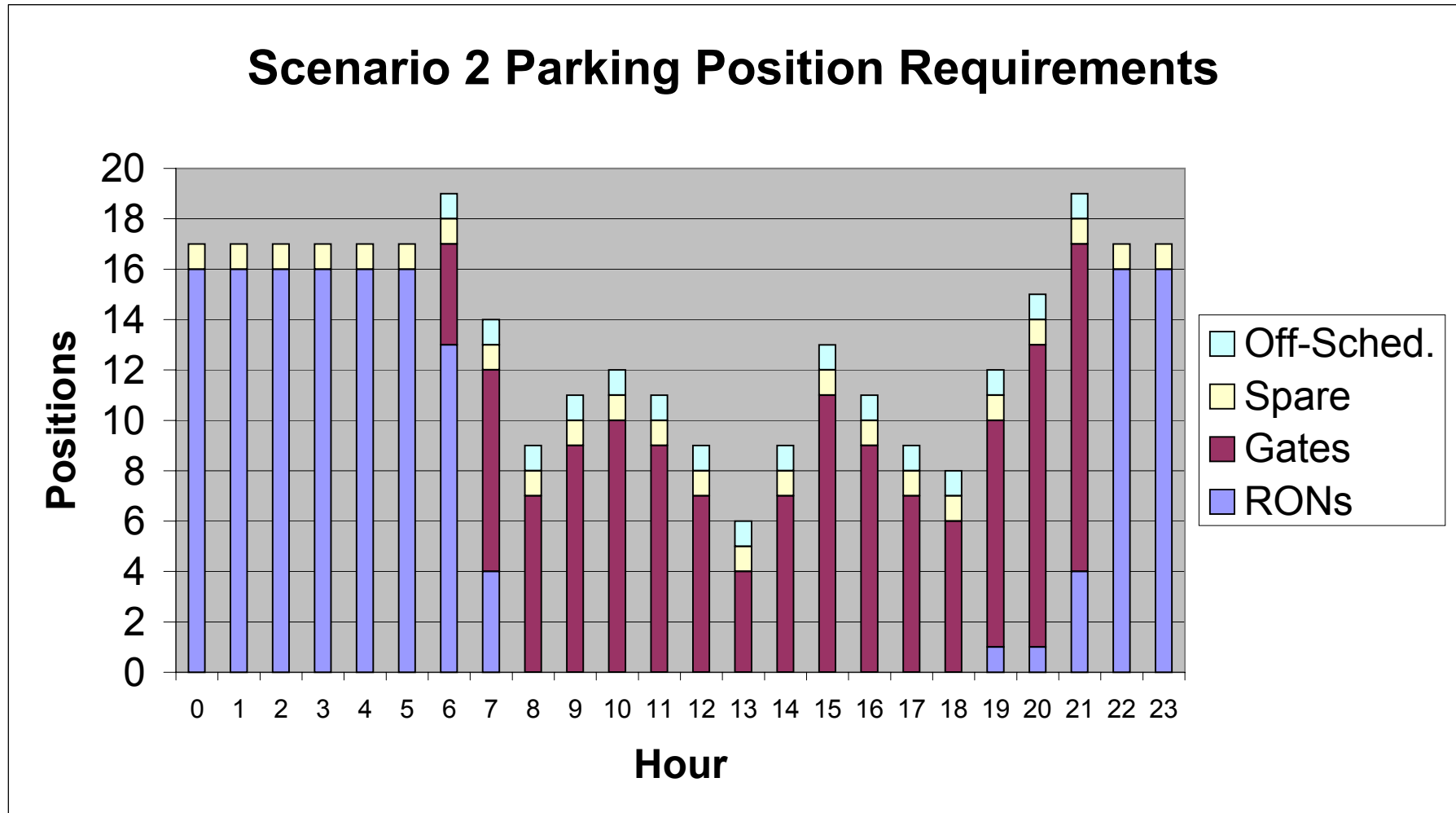
LONG BEACH AIRPORT



Sources: Appendix B and HNTB analysis.

Figure 3

LONG BEACH AIRPORT



Sources: Appendix B and HNTB analysis.

## Appendix B

LONG BEACH AIRPORT

## Scenario 1 Schedule

Rec. No.	Gate	Arrivals												Departures													
		RON	Type D/I	Origin	Arr. Hour	Arr. Min.	Air-line	Flt. No.	Equip-ment	Seats	Arr. L.F.	Arr. OD %	Depl	Term	RON	Type D/I	Dest.	Dept. Hour	Dept. Min.	Air-line	Flt. No.	Equip-ment	Seats	Dept. L.F.	Dept. OD %	Enp	Orig
1	G01	Y				B6		320	156							D	OAK	6	50	B6	242	320	156	0.95	1.00	148	148
2	G01		D	SLC	7	15	B6	231	320	156	0.95	1.00	148	148		D	BOS	8	10	B6	482	320	156	0.95	1.00	148	148
3	G01		D	FLL	9	25	B6	244	320	156	0.95	1.00	148	148		D	LAS	10	10	B6	280	320	156	0.95	1.00	148	148
4	G01		D	BOS	11	25	B6	481	320	156	0.95	1.00	148	148		D	OAK	12	55	B6	250	320	156	0.95	1.00	148	148
5	G01		D	OAK	13	25	B6	247	320	156	0.95	1.00	148	148		D	JFK	14	25	B6	222	320	156	0.95	1.00	148	148
6	G01		D	LAS	14	45	B6	281	320	156	0.95	1.00	148	148		D	OAK	15	20	B6	252	320	156	0.95	1.00	148	148
7	G01		D	IAD	16	10	B6	300	320	156	0.95	1.00	148	148		D	LAS	17	10	B6	284	320	156	0.95	1.00	148	148
8	G01		D	OAK	18	45	B6	253	320	156	0.95	1.00	148	148		D	SLC	19	55	B6	92	320	156	0.95	1.00	148	148
9	G01		D	OAK	20	30	B6	243	320	156	0.95	1.00	148	148		D	FLL	21	30	B6	243	320	156	0.95	1.00	148	148
10	G01		D	JFK	21	45	B6	217	320	156	0.95	1.00	148	148	Y					B6		320	156				
11	G02	Y				B6		320	156							D	JFK	7	5	B6	202	320	156	0.95	1.00	148	148
12	G02		D	OAK	8	5	B6	241	320	156	0.95	1.00	148	148		D	JFK	9	0	B6	204	320	156	0.95	1.00	148	148
13	G02		D	IAD	9	35	B6	311	320	156	0.95	1.00	148	148		D	IAD	10	30	B6	307	320	156	0.95	1.00	148	148
14	G02		D	JFK	11	45	B6	221	320	156	0.95	1.00	148	148	Y					B6		320	156				
15	G02		D	JFK	14	30	B6	209	320	156	0.95	1.00	148	148		D	JFK	15	40	B6	210	320	156	0.95	1.00	148	148
16	G02		D	OAK	16	25	B6	251	320	156	0.95	1.00	148	148		D	OAK	17	10	B6	300	320	156	0.95	1.00	148	148
17	G02		D	JFK	19	30	B6	215	320	156	0.95	1.00	148	148		D	OAK	20	25	B6	256	320	156	0.95	1.00	148	148
18	G02		D	IAD	20	40	B6	306	320	156	0.95	1.00	148	148		D	IAD	21	35	B6	255	320	156	0.95	1.00	148	148
19	G03	Y				B6		320	156							D	OAK	10	40	B6	244	320	156	0.95	1.00	148	148
20	G03		D	OAK	15	10	B6	310	320	156	0.95	1.00	148	148		D	IAD	16	10	B6	310	320	156	0.95	1.00	148	148
21	G03		D	JFK	17	0	B6	215	320	156	0.95	1.00	148	148		D	JFK	17	55	B6	210	320	156	0.95	1.00	148	148
22	G03		D	LAS	19	55	B6	285	320	156	0.95	1.00	148	148		D	BOS	21	0	B6	488	320	156	0.95	1.00	148	148
23	G03		D	BOS	21	20	B6	489	320	156	0.95	1.00	148	148	Y					B6		320	156				
24	G04		D	JFK	10	20	B6	205	320	156	0.95	1.00	148	148		D	JFK	11	20	B6	206	320	156	0.95	1.00	148	148
25	G04		D	JFK	20	50	B6	219	320	156	0.95	1.00	148	148		D	JFK	21	45	B6	216	320	156	0.95	1.00	148	148
26	G05	Y				AA		757	176							D	DFW	6	47	AA	1194	757	176	0.92	1.00	162	162
27	G05	Y				AA		757	176							D	DFW	9	5	AA	2414	757	176	0.92	1.00	162	162
28	G05		D	DFW	9	29	AA	2411	757	176	0.92	1.00	162	162		D	DFW	10	35	AA	2460	757	176	0.92	1.00	162	162
29	G05		D	DFW	13	49	AA	1343	757	176	0.92	1.00	162	162		D	DFW	14	41	AA	368	757	176	0.92	1.00	162	162
30	G05		D	DFW	19	50	AA	2405	757	176	0.92	1.00	162	162	Y					AA		757	176				
31	G05		D	DFW	21	48	AA	2164	757	176	0.92	1.00	162	162	Y					AA		757	176				
32	G06	Y				AA		757	176							D	JFK	7	30	AA	242	757	176	0.92	1.00	162	162
33	G06		D	JFK	10	49	AA	291	757	176	0.92	1.00	162	162		D	JFK	11	55	AA	290	757	176	0.92	1.00	162	162
34	G06		D	JFK	19	58	AA	241	757	176	0.92	1.00	162	162		D	JFK	21	15	AA	294	757	176	0.92	1.00	162	162
35	G06		D	JFK	21	58	AA	293	757	176	0.92	1.00	162	162	Y					AA		757	176				
36	G07	Y				AA*		CR7	70							D	SJC	7	5	AA*	NEW	CR7	70	0.85	1.00	60	60
37	G07		D	SJC	9	15	AA*	NEW	CR7	70	0.85	1.00	60	60		D	SJC	9	55	AA*	NEW	CR7	70	0.85	1.00	60	60
38	G07		D	SJC	11	55	AA*	NEW	CR7	70	0.85	1.00	60	60		D	SJC	12	35	AA*	NEW	CR7	70	0.85	1.00	60	60
39	G07		D	SJC	14	15	AA*	NEW	CR7	70	0.85	1.00	60	60		D	SJC	14	55	AA*	NEW	CR7	70	0.85	1.00	60	60
40	G07		D	SJC	17	20	AA*	NEW	CR7	70	0.85	1.00	60	60		D	SJC	18	0	AA*	NEW	CR7	70	0.85	1.00	60	60
41	G07		D	SJC	19	45	AA*	NEW	CR7	70	0.85	1.00	60	60		D	SJC	20	25	AA*	NEW	CR7	70	0.85	1.00	60	60
42	G07		D	SJC	21	25	AA*	NEW	CR7	70	0.85	1.00	60	60	Y					AA*		CR7	70				
43	G08	Y				HP		320	150							D	PHX	6	55	HP	6433	320	150	0.82	1.00	123	123
44	G08	Y				HP		320	150							D	LAS	7	55	HP	NEW	320	150	0.82	1.00	123	123
45	G08		D	PHX	8	47	HP	NEW	CR7	70	0.82	1.00	57	57		D	PHX	9	30	HP	NEW	CR7	70	0.82	1.00	57	57
46	G08		D	LAS	11	0	HP	NEW	CR7	70	0.82	1.00	57	57		D	LAS	11	40	HP	NEW	CR7	70	0.82	1.00	57	57
47	G08		D	PHX	11	47	HP	6693	CR7	70	0.82	1.00	57	57		D	PHX	12	30	HP	6526	CR7	70	0.82	1.00	57	57
48	G08		D	LAS	13	0	HP	NEW	CR7	70	0.82	1.00	57	57		D	LAS	13	40	HP	NEW	CR7	70	0.82	1.00	57	57
49	G08		D	PHX	14	43	HP	6094	320	150	0.82	1.00	123	123		D	PHX	15	30	HP	6416	320	150	0.82	1.00	123	123
50	G08		D	LAS	16	55	HP	NEW	320	150	0.82	1.00	123	123		D	LAS	17	35	HP	NEW	320	150	0.82	1.00	123	123
51	G08		D	PHX	17	49	HP	6099	CR7	70	0.82	1.00	57	57		D	PHX	18	25	HP	6092	CR7	70	0.82	1.00	57	57
52	G08		D	LAS	18	55	HP	NEW	CR7	70	0.82	1.00	57	57		D	LAS	19	35	HP	NEW	CR7	70	0.82	1.00	57	57
53	G08		D	PHX	20	56	HP	6090	320	150	0.82	1.00	123	123	Y					HP		320	150				
54	G08		D	LAS	21	3																					

## Appendix C

## LONG BEACH AIRPORT

## Scenario 2 Schedule

Rec. No.	Gate	Arrivals												Departures												
		RON	Type D/I	Origin	Arr. Hour	Arr. Min.	Air-line	Flt. No.	Equip-ment	Seats	Arr. L.F.	Arr. OD %	Depl Term	RON	Type D/I	Dest.	Dept. Hour	Dept. Min.	Air-line	Flt. No.	Equip-ment	Seats	Dept. L.F.	Dept. OD %	Enp	Orig
1 G01	Y						B6		320	156					D	OAK	6	50	B6	242	320	156	0.95	1.00	148	148
2 G01		D	SLC		7	15	B6	231	320	156	0.95	1.00	148 148	D	BOS	8	10	B6	482	320	156	0.95	1.00	148	148	
3 G01		D	FLL		9	25	B6	244	320	156	0.95	1.00	148 148	D	LAS	10	10	B6	280	320	156	0.95	1.00	148	148	
4 G01		D	BOS		11	25	B6	481	320	156	0.95	1.00	148 148	D	OAK	12	55	B6	250	320	156	0.95	1.00	148	148	
5 G01		D	OAK		13	25	B6	247	320	156	0.95	1.00	148 148	D	JFK	14	25	B6	222	320	156	0.95	1.00	148	148	
6 G01		D	LAS		14	45	B6	281	320	156	0.95	1.00	148 148	D	OAK	15	20	B6	252	320	156	0.95	1.00	148	148	
7 G01		D	IAD		16	10	B6	300	320	156	0.95	1.00	148 148	D	LAS	17	10	B6	284	320	156	0.95	1.00	148	148	
8 G01		D	OAK		18	45	B6	253	320	156	0.95	1.00	148 148	D	SLC	19	55	B6	92	320	156	0.95	1.00	148	148	
9 G01		D	OAK		20	30	B6	243	320	156	0.95	1.00	148 148	D	FLL	21	30	B6	243	320	156	0.95	1.00	148	148	
10 G01		D	JFK		21	45	B6	217	320	156	0.95	1.00	148 148	Y					B6		320	156				
11 G02	Y						B6		320	156				D	JFK	7	5	B6	202	320	156	0.95	1.00	148	148	
12 G02		D	OAK		8	5	B6	241	320	156	0.95	1.00	148 148	D	JFK	9	0	B6	204	320	156	0.95	1.00	148	148	
13 G02		D	IAD		9	35	B6	311	320	156	0.95	1.00	148 148	D	IAD	10	30	B6	307	320	156	0.95	1.00	148	148	
14 G02		D	JFK		11	45	B6	221	320	156	0.95	1.00	148 148	Y					B6		320	156				
15 G02		D	JFK		14	30	B6	209	320	156	0.95	1.00	148 148	D	JFK	15	40	B6	210	320	156	0.95	1.00	148	148	
16 G02		D	OAK		16	25	B6	251	320	156	0.95	1.00	148 148	D	OAK	17	10	B6	300	320	156	0.95	1.00	148	148	
17 G02		D	JFK		19	30	B6	215	320	156	0.95	1.00	148 148	D	OAK	20	25	B6	256	320	156	0.95	1.00	148	148	
18 G02		D	IAD		20	40	B6	306	320	156	0.95	1.00	148 148	D	IAD	21	35	B6	255	320	156	0.95	1.00	148	148	
19 G02		D	FLL		21	50	B6	NEW	320	156	0.95	1.00	148 148	Y					B6		320	156				
20 G03	Y						B6		320	156				D	SLC	8	0	B6	NEW	320	156	0.95	1.00	148	148	
21 G03	Y						B6		320	156				D	OAK	10	40	B6	244	320	156	0.95	1.00	148	148	
22 G03		D	OAK		15	10	B6	310	320	156	0.95	1.00	148 148	D	IAD	16	10	B6	310	320	156	0.95	1.00	148	148	
23 G03		D	JFK		17	0	B6	215	320	156	0.95	1.00	148 148	D	JFK	17	55	B6	210	320	156	0.95	1.00	148	148	
24 G03		D	LAS		19	55	B6	285	320	156	0.95	1.00	148 148	D	BOS	21	0	B6	488	320	156	0.95	1.00	148	148	
25 G03		D	BOS		21	20	B6	489	320	156	0.95	1.00	148 148	Y					B6		320	156				
26 G04	Y						B6		320	156				D	FLL	9	0	B6	NEW	320	156	0.95	1.00	148	148	
27 G04		D	JFK		10	20	B6	205	320	156	0.95	1.00	148 148	D	JFK	11	20	B6	206	320	156	0.95	1.00	148	148	
28 G04		D	BOS		15	55	B6	NEW	320	156	0.95	1.00	148 148	D	BOS	16	50	B6	NEW	320	156	0.95	1.00	148	148	
29 G04		D	JFK		20	50	B6	219	320	156	0.95	1.00	148 148	D	JFK	21	45	B6	216	320	156	0.95	1.00	148	148	
30 G05		D	SLC		20	30	B6	NEW	320	156	0.95	1.00	148 148	Y					B6		320	156				
31 G06	Y						AA		757	176				D	DFW	6	47	AA	1194	757	176	0.92	1.00	162	162	
32 G06	Y						AA		757	176				D	ORD	8	15	AA	NEW	757	176	0.92	1.00	162	162	
33 G06	Y						AA		757	176				D	DFW	9	5	AA	2414	757	176	0.92	1.00	162	162	
34 G06		D	DFW		9	29	AA	2411	757	176	0.92	1.00	162 162	D	DFW	10	35	AA	2460	757	176	0.92	1.00	162	162	
35 G06		D	ORD		11	15	AA	NEW	757	176	0.92	1.00	162 162	D	ORD	12	15	AA	NEW	757	176	0.92	1.00	162	162	
36 G06		D	DFW		13	49	AA	1343	757	176	0.92	1.00	162 162	D	DFW	14	41	AA	368	757	176	0.92	1.00	162	162	
37 G06		D	DFW		19	50	AA	2405	757	176	0.92	1.00	162 162	Y					AA		757	176				
38 G06		D	ORD		20	45	AA	NEW	757	176	0.92	1.00	162 162	Y					AA		757	176				
39 G06		D	DFW		21	48	AA	2164	757	176	0.92	1.00	162 162	Y					AA		757	176				
40 G07	Y						AA		757	176				D	JFK	7	30	AA	242	757	176	0.92	1.00	162	162	
41 G07		D	JFK		10	49	AA	291	757	176	0.92	1.00	162 162	D	JFK	11	55	AA	290	757	176	0.92	1.00	162	162	
42 G07		D	ORD		15	15	AA	NEW	757	176	0.92	1.00	162 162	D	ORD	16	15	AA	NEW	757	176	0.92	1.00	162	162	
43 G07		D	JFK		19	58	AA	241	757	176	0.92	1.00	162 162	D	JFK	21	15	AA	294	757	176	0.92	1.00	162	162	
44 G07		D	JFK		21	58	AA	293	757	176	0.92	1.00	162 162	Y					AA		757	176				
45 G08	Y						AA*		CR7	70				D	SJC	7	5	AA*	NEW	CR7	70	0.85	1.00	60	60	
46 G08		D	SJC		9	15	AA*	NEW	CR7	70	0.85	1.00	60 59.5	D	SJC	9	55	AA*	NEW	CR7	70	0.85	1.00	60	60	
47 G08		D	SJC		11	55	AA*	NEW	CR7	70	0.85	1.00	60 59.5	D	SJC	12	35	AA*	NEW	CR7	70	0.85	1.00	60	60	
48 G08		D	SJC		14	5	AA*	NEW	CR7	70	0.85	1.00	60 59.5	D	SJC	14	35	AA*	NEW	CR7	70	0.85	1.00	60	60	
49 G08		D	SJC		16	0	AA*	NEW	CR7	70	0.85	1.00	60 59.5	D	SJC	16	35	AA*	NEW	CR7	70	0.85	1.00	60	60	
50 G08		D	SJC		17	55	AA*	NEW	CR7	70	0.85	1.00	60 59.5	D	SJC	18	35	AA*	NEW	CR7	70	0.85	1.00	60	60	
51 G08		D	SJC		19	45	AA*	NEW	CR7	70	0.85	1.00	60 59.5	D	SJC	20	25	AA*	NEW	CR7	70	0.85	1.00	60	60	
52 G08		D	SJC		21	25	AA*	NEW	CR7	70	0.85	1.00	60 59.5	Y					AA*		CR7	70				
53 G09	Y						HP		320	150				D	PHX	6	55	HP	6433	320	150	0.82	1.00	123	123	
54 G09	Y						HP</																			

76 G12	Y				F9*		CR7	70						D	DEN	6	55 F9*	NEW	CR7	70	0.85	1.00	60	60
77 G12		D	DEN	8	30 F9*	NEW	CR7	70	0.85	1.00	60	60		D	DEN	9	0 F9*	NEW	CR7	70	0.85	1.00	60	60
78 G12		D	DEN	11	5 F9*	NEW	CR7	70	0.85	1.00	60	60		D	DEN	11	35 F9*	NEW	CR7	70	0.85	1.00	60	60
79 G12		D	DEN	15	10 F9*	NEW	CR7	70	0.85	1.00	60	60		D	DEN	15	40 F9*	NEW	CR7	70	0.85	1.00	60	60
80 G12		D	DEN	18	10 F9*	NEW	CR7	70	0.85	1.00	60	60		D	DEN	18	40 F9*	NEW	CR7	70	0.85	1.00	60	60
81 G12		D	DEN	21	45 F9*	NEW	CR7	70	0.85	1.00	60	60	Y				F9*		CR7	70				
82 G13	Y				DL*		CR7	70						D	SLC	7	25 DL*	NEW	CR7	70	0.85	1.00	60	60
83 G13		D	SLC	9	45 DL*	NEW	CR7	70	0.85	1.00	60	60		D	SLC	10	25 DL*	NEW	CR7	70	0.85	1.00	60	60
84 G13		D	SLC	12	20 DL*	NEW	CR7	70	0.85	1.00	60	60		D	SLC	13	0 DL*	NEW	CR7	70	0.85	1.00	60	60
85 G13		D	SLC	16	20 DL*	NEW	CR7	70	0.85	1.00	60	60		D	SLC	17	0 DL*	NEW	CR7	70	0.85	1.00	60	60
86 G13		D	SLC	19	45 DL*	NEW	CR7	70	0.85	1.00	60	60	Y				DL*		CR7	70				

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Sources: Official Airline Guide as compiled by BACK Aviation Solutions, and HNTB analysis.

# **FACILITY REQUIREMENTS ANALYSIS LONG BEACH AIRPORT**

May 14, 2004

Prepared by

**HNTB**

## **FACILITY REQUIREMENTS ANALYSIS LONG BEACH AIRPORT**

Facility requirements for the Long Beach Airport (LGB) passenger terminal were analyzed by applying industry-based facility planning factors to forecast future passenger levels. First, a calculated space program was developed that represents the size of facility that would typically be needed for a totally new airport terminal that does not have the existing physical constraints of LGB. Second, the calculated space program was then compared to the existing facilities to assess facility needs. Third, recognizing that the terminal at LGB is constrained by the site and by the historic standing of the main building, a more limited building program was developed within the constraints of the existing facilities – one that minimizes new expansion, and still provides an adequate level of service for the forecast passenger activity at LGB.

The first sections of this report describe how an unconstrained new terminal would typically be sized, using industry standards, published FAA guidelines and rules of thumb. Then the resulting calculated facility requirements are compared to the existing airport facilities and to the recommended facility program.

### **Forecast Passenger Traffic and Gates**

Forecasts were developed for LGB for two alternative forecast scenarios: Scenario 1 in which existing daily slot restrictions apply, and Scenario 2 in which the number of daily flights increase but stay within specified noise limits of the Noise Ordinance. Passenger activity forecasts can be found in HNTB's "Passenger Activity Forecast – Long Beach Airport" dated May 14, 2000. The forecasts include estimates of annual enplanements as well as peak period passenger traffic for an average day in the peak month.

While the number of annual enplanements is an overall indicator of an airport's relative activity level from year to year, terminal facility requirements analysis is largely based on peak period activity rather than annual traffic, as terminals need to be sized to accommodate the periods of highest demand. The peak period activity relative to annual activity varies from airport to airport, and is dependent on a variety of factors including flight schedules, aircraft types, seat load factors, and seasonal influences. Passenger terminal facilities are typically planned for the average day in the peak month. Within that average day, there are peak departure periods, peak arrival periods and peak combined traffic periods, all of which factor into the sizing of the individual components of the terminal building and supporting facilities.

Peak period traffic projections are necessary because facility planning factors that measure the capacity of each terminal component are typically based on peak period activity such as: peak hour enplanements, peak hour deplanements; peak 20-minute

deplanements; and peak hour total passengers. The forecasts also estimate the number of gates needed and the anticipated sizes of aircraft.

Passenger activity at LGB is primarily domestic origination and destination (O&D) traffic. As such, the number of originating passengers is practically equal to the number of enplanements; and the number of terminating passengers is practically equal to the number of deplanements, resulting in minimal transfer passengers.

## **Facility Planning Factors**

Calculated facility requirements, shown in Tables 1 and 2 were estimated based on the industry planning factors and assumptions described in this section. The planning factors include both calculated factors as well as industry standard planning factors, such as those found in the *U.S. Department of Transportation, Federal Aviation Administration (FAA), Planning and Design Guidelines for Airport Terminal Facilities, Advisory Circular (AC 150/5360-13)*.

In the tables, functional terminal space is organized into the following categories: Airline Functions, Concessions, Secure Public Area, Non-Secure Public Area, and Non-Public Area. The first two categories are generally revenue producing for the airport, while the remaining categories are non-leased public and non-public spaces, including circulation and building support space.

Actual building areas would be lower or higher than the calculated requirements due to the building's final geometric layout, existing constraints and conditions, owner and tenant operational preferences, construction phasing requirements, and other unique circumstances that planning factors cannot fully anticipate. Also, the building design must comply with pertinent building code requirements of the City of Long Beach, which, if more stringent, would override any requirements estimated based on planning factors.

### ***Airline Functions***

Ticket counter length: 0.17 linear feet times the number of peak hour, average day, peak month passenger originations. Alternatively, the nomograph in *AC 150/5360-13* yields an equivalent value. Existing ticket counter usage at LGB is approximately 0.14 linear feet per peak hour, average day, peak month passenger originations, due to the efficiencies of electronic ticketing and check-in; however, the current counters are fully utilized and additional counters will be needed to accommodate additional passengers as well as provide counters for new commuter airlines that are not handled by existing airlines.

The ticket counter length planning factor selected for the requirements calculation is low, reflecting a higher than normal utilization rate and strong passenger check-in peaks. Alternatively, the ticket counter length can also be approximated from *AC 150/5360-13*,

Figure 5-10. To use the figure, divide the total number of seats on the aircraft using the gates by 100 to get “Equivalent Aircraft”. In forecast Scenario 1 aircraft seats total 1,462 which translate to 14.6 Equivalent Aircraft.

Ticket counter area: length of ticket counter times a depth of 10.5 feet from public face of counter to back wall. The ticket counter area planning factor is based on the typical airline standard: 3 foot deep counter shell, 3.5 feet of agent standing space, and 4 foot wide conveyor frame with trim. See also, *AC 150/5360-13* Figure 5-6 which depicts a similar standard.

Ticket counter queuing: length of ticket counter times 15 feet deep. In the industry, ticket counter queuing typically ranges from a minimum of 12 to 15 feet deep to 20 feet deep or more. The 12 to 15-foot standard is depicted in *AC 150/5360-13* Section 69.a.2 and Figure 5-6; however, where stanchions are used to queue passengers in lines parallel to the counter, 15-feet deep is considered the minimum.

Airline ticket offices (ATO): length of ticket counter times depth of 25 feet, or alternatively, read from nomograph in *AC 150/5360-13*, which yields a similar value. In the industry, ATO depths range from 20 feet to 30 feet or more. For this analysis, the planning factor assumes an average depth of 25 feet, which is slightly less than the existing ATO depth at LGB. Figures 5-6 and 5-11 in *AC 150/5360-13* support an average depth of 20 feet and 25 feet, respectively.

Baggage claim frontage: based on an analysis of the number and sizes of claim devices required to serve the specific aircraft (up to B757-size) and the number of airlines (assumed three) arriving during a peak 20-minute, average day, peak month period. The length of each device is based on the maximum number of bags the device must be able to handle during the peak 20-minute, average day, peak month period (average 1.3 bags per passenger on each plane, up to approximately 230 bags per plane). At LGB the planning factor equates to approximately 0.35 linear feet per peak hour, average day, peak month terminating passenger. Alternatively, the nomograph in *AC 150/5360-13*, Figure 5-27, yields a nearly equivalent value. Note: this analysis assumes a consolidated baggage claim operation in which all devices are in the same area, as typically would be the case for a new terminal; however, a split baggage claim operation, as exists at LGB, would typically require one or more additional devices to handle individual passenger arrival peaks.

In the industry, claim frontage typically ranges as high as 0.5 to 0.8 linear feet per peak hour, average day, peak month period terminating passenger. At LGB there are fewer carriers and baggage claim devices are used more efficiently, allowing for a lower planning factor of 0.35.

Baggage claim area: based on number and sizes of claim devices with at least 12 foot clearance around devices. Alternatively, the nomograph in *AC 150/5360-13*, Figure 5-29, yields a similar value. In the industry, baggage claim areas typically range between 20 to 30 square feet per peak hour, average day, peak month terminating passenger. However,

the planning factor for LGB is much lower (just under 10 square feet per peak hour termination), reflecting the use of direct-feed flat plate claim devices, which require less space than sloped plate claim devices. Also, the clearances around the devices is not as great as at most airports. Note: the baggage claim area is calculated based on a consolidated baggage claim area. If the baggage claim area involves separate baggage claim areas, as is the case at LGB, additional area would be required due to additional baggage claim devices.

Baggage service office: average 300 square feet per airline (varies per airline). This is a typical airline baggage service office size, observable at many small to medium size airports.

Outbound baggage: approximately the length of the ticket counter times 65 feet deep. The nomograph in *AC 150/5360-13*, Figure 5-13, yields a lower value, but the value must be adjusted higher to reflect the high passenger aircraft load factors that exist today at LGB (as much as 30% higher than typical in the airline industry when the *AC 150/5360-13* was written). In the industry, baggage make-up areas can vary in depth from 45 feet to over 100 feet (average 65 feet for smaller airports), and range from 10 to over 25 square feet per peak hour, average day, peak month originating passenger; outbound baggage areas are even larger when auto-sortation equipment and/or EDS functions are incorporated in the space.

Inbound baggage: approximately 30 feet (for load belt and two tug lanes – one for baggage drop and one for tug by-pass) times the length of baggage claim area (approximately 80 feet per device). Alternatively, the nomograph in *AC 150/5360-13* yields a similar value.

In the industry, inbound baggage areas average 7 square feet per peak hour, average day, peak month period terminating passenger, not including tug circulation space that may be required to access the baggage unloading area. Alternatively, read approximate inbound baggage area from *AC 150/5360-13* Figure 5-30; however, space must be added to chart values for tug circulation by-pass lanes.

Airline operations: varies per airline (typically between 0.003 and 0.020 square feet per annual enplanement). Alternatively, estimate 500 square feet per equivalent peak hour, average day, peak month period aircraft departure per *AC 150/5360-13*, which is an average value. Determined from various airline requests, it was estimated that 10,000 square feet of additional office space was needed, which results in a planning factor of approximately 0.0047 square feet per annual enplanement. This planning factor does not include airline operations space remote from the terminal.

The carriers at LGB operate more efficiently than carriers at many airports, with less demand for operations space at the terminal and holdroom buildings. Also, at LGB some operations space is included in the airline ticket office areas. Alternatively, see *AC 150/5360-13* Section 76.c.

Departure lounges: based on specific aircraft types and typical industry sizing criteria CRJ700 (70 seats): 900 to 1,000 (average 950) square feet; B737-700 (120 seats): 1,600 to 1,900 (average 1,750) square feet; A320 (156 seats): 1,900 to 2,200 (average 2,050) square feet; and B757-200 (176 seats): 2,100 to 2,400 (average 2,250) square feet. These departure lounge size ranges include the passenger seating areas, airline gate counters, and boarding door aisles, but do not include general circulation, restrooms and other concourse spaces. The current “holdrooms” at LGB in the permanent and temporary buildings include departure lounge seating, gate counters, and boarding aisles, plus general circulation and restrooms. In this analysis, general circulation and restroom areas are sized separately (see “Secure Public Area” – Concourse circulation” and “Restrooms” below).

Sizes are calculated assuming departure lounge seating areas to accommodate 70% of number of seats on the aircraft (average 13.5 square feet per seat) plus 600 square feet for gate counter, counter queuing and boarding/deplaning aisle. Note: only 70% of number of seats on the aircraft are assumed rather than the full passenger load because not all passengers will want to sit in the departure lounge; many will be in the process of boarding, or in other areas of the building such as restrooms, concessions and general circulation areas. For departure lounge sizing, see also *AC 150/5360-13*, Table 5-3; however, values in the table must be increased to reflect higher seat load factors (95% to 100%) often experienced during the peak hour, average day, peak month by the carriers at LGB.

### ***Concessions***

Concessions: approximately 0.010 square feet per annual enplanement. Alternatively, the nomograph in *AC 150/5360-13* yields a similar value. The planning factor is a typical industry planning factor. Alternatively, read approximate concessions areas from *AC 150/5360-13*, Figure 5-31 (40% to 60% daily use factors) and Figure 5-32; see also Section 77 and 78. Note: concessions area sizes vary significantly from airport to airport and actual sizes are based on very detailed analysis beyond the scope of this estimate.

Concessions storage: based on approximately 0.002 square feet per annual enplanement. The planning factor is a typical factor based on concessions storage provisions at other airports; not specifically addressed in *AC 150/5360-13*. Storage requirements vary significantly from airport to airport.

### ***Secure Public Area***

Passenger screening checkpoint: approximately 13 feet by 60 feet per lane, plus 40 feet of queuing equals 1,300 square feet per lane; number of lanes based on 180 people per lane per hour; TSA determines the actual requirements. The planning factor is an approximate factor observed at other airports; however, TSA requirements vary airport to airport. Published guidelines are not available. New security checkpoint requirements at LGB, such as for the passenger selectee lane, will require refinement of the planning factor.

Concourse circulation: highly dependent on geometric layout of terminal; approximately 1,500 square feet per jet gate assumed for single loaded concourses, with 20 foot corridor width. The planning factor is based on a 20-foot wide circulation corridor contiguous to an average sized departure lounge with a depth of 30 feet and length of 60 feet, plus 25% additional area for concourse circulation space not adjacent to departure lounges. See also *AC 150/5360-13* Section 72, which addresses pedestrian flow rates; however, 20 feet is a typical minimum width standard where flow rate calculations do not indicate that a wider corridor is necessary. At LGB, passenger flow rates are not likely to exceed the capacity of a 20-foot wide corridor as long as adjacent facilities are properly sized to accommodate passenger waiting. The 20-foot width of circulation is an average value; with greater width needed around restrooms and concessions where passengers congregate, and narrower widths where passengers are able to free-flow. The circulation corridor is vital to allow enplaning and deplaning passengers to move freely through the concourse, to and from the gates without bottlenecks.

Restrooms: approximately 3 square feet per peak hour, average day, peak month passenger (or approximately 2,000 square feet per men/women pair including janitor). The planning factor is based on restroom areas at other similar airports, rather than occupancy-based building code requirement which does not usually satisfy actual passenger needs. See also *AC 150/5360-13* Section 78.m. which suggests 1,500 square feet to 1,800 square feet per 500 peak hour, average day, peak month period passengers.

### ***Non-secure Public Area***

Circulation – ticketing: 30 feet times the length of ticket counter area, which includes 20 feet clear width for circulation and 10 feet for electronic check-in units, seating, phones and flight information display system (FIDS). Refer to *AC 150/5360-13* Section 69.a.2.

Circulation – baggage claim: 30 feet times the length of baggage claim area, which includes 20 feet clear width for circulation and 10 feet for seating, phones and FIDS. Refer to *AC 150/5360-13* Section 69.c.2.

Circulation – general: dependent on geometric layout of terminal; typically approximately 10% of gross building area. This typical airport terminal space requirement varies widely from terminal to terminal. No industry standard planning factor available.

Restrooms: approximately 2 square feet per peak hour, average day, peak month passenger (and 2,000 to 2,400 square feet per men/women pair including janitor). The planning factor is based on restroom areas at similar airports rather than occupancy-based building code requirement which does not usually satisfy actual passenger needs. See also *AC 150/5360-13* Section 78.m. which suggests 1,500 square feet to 1,800 square feet per 500 peak hour, average day, peak month passengers.

### ***Non-Public Area***

EDS / TSA: highly dependent on specific baggage screening concept; for LGB an automated inline baggage screening facility could require an area 80% to 100% of the outbound baggage make-up area (80% has been assumed in the calculation). This planning approximation is based on an automated in-line system at a small airport; however, each airport is unique and screening technology will change. This space is for baggage screening and does not include TSA general office space. No industry standard planning factor available.

Airport administration: assumed approximately 10,000 square feet, which is larger than the existing airport administration space to provide needed conference rooms and additional airport security office space (varies widely from airport to airport). No industry standard planning factor exists; however, airport administration space is typically in a range of 5 to 8% of gross terminal area for terminals under 100,000 square feet, and 3 to 5% of gross terminal area for terminals over 100,000 square feet.

Loading dock: approximately 800 square feet per dock. The planning factor is based on a 40-foot wide dock with 20 foot depth.

Restrooms: three sets containing men/women/janitor, each set approximately 600 square feet. These are assumed non-public restrooms for employee convenience and building code compliance. No industry standard planning factor is available.

Circulation: dependent on geometric layout of terminal; assumed approximately 4.0% of gross terminal area. Non-public circulation space varies widely from terminal to terminal, typically ranging from 2% to 5% of gross terminal area. No industry standard planning factor available.

Maintenance and Storage: assumed approximately 2.0% of gross building area. In the industry, maintenance and storage space varies between 1% and 3% of gross building area.

Mechanical/electrical: assumed approximately 10% of gross building area. In the industry, mechanical and electrical space requirements typically vary between 7% and 12% of gross building area. *AC 150/5360-13* Section 78.t. suggests even larger areas for mechanical and electrical.

Other: assumed approximately 5% of gross building area. This category includes utility chases and certain structural elements. In the industry, “other space” may account for approximately 5% of gross building areas. Refer also to *AC 150/5360-1* Section 78.u, which recommends 5% of gross building area as the value of building structure.

## **Gross Terminal Building Area Check**

There are two rules-of-thumb stated in the FAA's *AC 150/5360-13* Section 67.b, for estimating gross terminal building area. They are: (1) 150 square feet per design peak-hour passenger [peak hour, average day, peak month], and (2) 0.08 to 0.12 square feet per annual enplanement.

### 150 sq. ft. / design peak-hour passenger (PHP)

Scenario 1:  $1,828 \text{ PHP} \times 150 \text{ sq. ft./PHP} = 274,200 \text{ sq. ft.}$

Scenario 2:  $1,867 \text{ PHP} \times 150 \text{ sq. ft./PHP} = 280,050 \text{ sq. ft.}$

### 0.08 to 0.12 square feet per annual enplanement (ANNEP)

Scenario 1:  $0.08 \text{ to } 0.12 \text{ sq. ft.} \times 2,127,581 \text{ ANNEP} = 170,286 \text{ to } 255,310 \text{ sq. ft.}$

Scenario 2:  $0.08 \text{ to } 0.12 \text{ sq. ft.} \times 2,522,015 \text{ ANNEP} = 201,761 \text{ to } 302,642 \text{ sq. ft.}$

The estimates of required total terminal space shown in Tables 1 and 2 are well below the FAA's "150 sq. ft./PHP" rule-of-thumb, and within the range of the FAA's "0.08 to 0.12 sq. ft./ANNEP" rule-of-thumb. This reflects a very efficient design, especially since the FAA rules-of-thumb do not include the additional space required for passenger and baggage screening following 9/11/2001.

## **Comparison of Calculated Facility Requirements to Existing Facility**

Table 3 compares the calculated facility space requirements for the two forecast scenarios to the approximate existing terminal areas at LGB. Scenario 1 and 2 requirements indicate a terminal that is significantly larger than the existing. Much of the size difference is because many components of the existing terminal do not meet current industry standards, and cannot be expanded significantly due to existing site constraints and the historic nature of the main building.

## **Recommended Facility Program**

While the calculated facility requirements indicate the relative size of a new terminal based on industry standards, the realities of LGB require a scaled back program that is customized to the unique circumstances of LGB. First of all, the main terminal building is an historic structure and is not easy to expand while maintaining its integrity. Secondly, the site is very constrained from landside to airside, requiring facilities to be squeezed into the available land area. Thirdly, the airport must remain operational during any improvements program, restricting the extent to which new facilities can be constructed. Fourthly, limited financial resources require the most efficient and economical construction. For these reasons, a limited improvements program for LGB is recommended.

The recommended improvements include: holdrooms; passenger and baggage security screening areas; concessions space; baggage claim area improvements; office space for security, airline and airport support staff; and ticketing facilities. These elements are listed and quantified in the right hand column of Table 4, in comparison to the elements of the project described in the September 22, 2003 Notice of Preparation and Scoping of the Long Beach Airport Terminal Improvements EIR. Table 4 also compares the recommended program to the calculated facility requirements for passenger activity forecast Scenario 1, and to the existing terminal facilities. The footnotes in the table explain the basis for the sizes of the holdrooms and non-secure restrooms. These and other recommended areas of improvement are described below.

### ***Holdroom Areas***

Holdrooms would replace the existing temporary holdrooms and supplement the existing holdroom building. New holdroom areas would total approximately 26,450 square feet and include departure lounges, passenger circulation space and restrooms. The total new departure lounge area, combined with the existing permanent departure lounge area, equals the calculated required departure lounge area for the gates required under forecast Scenario 1 (see “Facility Planning Factors – Departure lounges”). The circulation area is based on an average 20-foot wide circulation corridor for an estimated 500-foot length of holdroom building (see “Facility Planning Factors – Concourse circulation”). Restrooms are sized based on two men/women restroom modules of approximately 1,600 square feet each (see “Facility Planning Factors – Secure Public Area Restrooms”).

### ***Passenger Security Screening Areas***

Approximately 10,000 square feet of passenger screening area would be developed in accordance with TSA requirements to accommodate the anticipated passenger throughput. This area includes an estimated 6,000 square feet of screening space and 4,000 square feet of passenger queuing and is based on previous studies, as well as the calculated facility requirements using a planning factor of 180 people per checkpoint lane (see “Facility Planning Factors – Passenger screening checkpoint”). TSA would determine the actual size of the facility.

### ***Concession Areas***

Up to 20,000 square feet of new food, beverage and gift concessions area would be developed adjacent to the new holdroom areas to serve the anticipated number of passengers. The area appears economically justified based on passenger traffic and typical facility planning factors (see “Facility Planning Factors – Concessions”), but site area constraints may limit the available space for this function.

### ***Baggage Security Screening Areas***

The area west of the main terminal would be improved to accommodate TSA screening of outbound passenger baggage. Approximately 7,000 to 10,000 square feet of building

space is anticipated for this function. This is based on the limited land area potentially available for this function. TSA would determine the actual size of the facility.

### ***Baggage Claim Areas***

Areas to the south and north of the terminal would be developed to accommodate the baggage claim requirements of the anticipated inbound passenger traffic. Baggage claim areas would be exterior covered space and include baggage claim devices with a total of 820 linear feet (510 linear feet of frontage on the passenger side and 310 linear feet on the airline loading side). Associated with the baggage claim area would be 900 square feet of baggage service offices, 2,000 square feet of public restrooms, and 300 square feet of multipurpose rooms. The baggage claim device linear feet is based on the calculated requirements for passenger activity forecast Scenario 1 (see “Facility Planning Factors – Baggage claim frontage, and Baggage service offices”) increased by the length of one additional device, because the baggage claim function will be a split operation, requiring two devices on the north side of the terminal and two devices on the south side to handle each side’s passenger arrival peaks. The calculated requirements assumed a consolidated baggage claim area, which would require only three devices. Restroom area is based on two sets of men/women restroom modules of 1,000 square feet each. Multipurpose rooms may be used for baggage storage or other functions related to baggage claim.

### ***Office Space for Security, Airline and Airport Support Staff***

Approximately 28,500 square feet of office space to serve the needs of the TSA, the airlines and airport would be provided. The area is based on a space allocation of 13,500 square feet for TSA space (current TSA authorization for Category 1 Airport), 10,000 square feet for airline offices (correcting for inadequate existing airline operations office space), and 5,000 square feet for airport staff offices and conference rooms (relieving current deficiencies); however, this allocation of the space could change based on actual requirements. TSA and the airlines currently have office space in temporary trailers, and many of the existing airport administration offices are in spaces not intended for this function. The new 28,500 square feet of area would resolve the current and projected deficiencies, and could be located at a second floor level over either the new holdrooms or baggage claim area, or other close-in area. The space would not be designed to accommodate holdrooms.

### ***Ticketing Facilities***

Ticketing facility improvements are required to accommodate additional ticket counters, passenger queuing, and circulation space, to relieve current congestion during peak periods and to allow the ticketing facilities to handle originating passenger traffic anticipated under forecast Scenario 1. Approximately 6,180 square feet of additional ticketing facilities will be needed. The ticketing space is based on calculated facility requirements for passenger activity forecast Scenario 1 (see “Facility Planning Factors – Ticket counter area, Ticket counter queuing, and Circulation – ticketing”).

### ***Aircraft Gates***

Under passenger activity forecast Scenario 1, eleven gates are required, a “gate” being defined as an aircraft parking position associated with a holdroom departure lounge. The departure lounges would be sized to accommodate the following representative aircraft sizes: 2 B757-200; 5 A320; 1 B737-700; and 3 CRJ-700. The number of gates equals the required number of departure lounges, based on the projected future aircraft arrival and departure schedule. See HNTB’s “Passenger Activity Forecast - Long Beach Airport” dated May 14, 2004 for further explanation of the required aircraft gates.

### ***Aircraft Parking Positions***

To accommodate the forecast peak hour aircraft gate fleet mix, as well as provide flexibility to accommodate delays in flight arrivals and departures, the following aircraft parking positions would be provided: 4 B757-size; 8 A320 or B737-size; and 4 regional jets. The number and size of aircraft parking positions is estimated based on the required combination of gate positions, remaining overnight (RON) positions, one spare position, and one position to accommodate off-schedule operations. See HNTB’s “Passenger Activity Forecast - Long Beach Airport” dated May 14, 2004 for further explanation of the aircraft parking positions.

### **Conclusion**

Facility requirements were analyzed based on current industry standards, including published FAA terminal facility guidelines. For comparison purposes, facility requirements were calculated for an unconstrained terminal facility and then compared to the existing LGB terminal facilities. LGB, however, has existing site constraints and unique circumstances that limit the size of the facility; therefore, the recommended building program is considerably less than the calculated requirements, resulting in a smaller development program, but still adequate to process the anticipated passenger throughput under passenger activity forecast Scenario 1 at a reasonable level of service.

Table 1

## LONG BEACH AIRPORT

## Passenger Terminal Facility Requirements - Scenario 1

Description	Demand Level		Planning Factor		LF	SF	Comments
<b>Airline Functions</b>							
Ticket Counter Area	1,083	PHOP	1.78	SF/PHOP	184	1,928	10.5' x length of t/c
Ticket Counter Length	1,083	PHOP	0.17	LF/PHOP			
Ticket Counter Queuing	1,083	PHOP	2.55	SF/PHOP		2,762	15' x length of t/c
Airline Ticket Office	1,083	PHOP	4.25	SF/PHOP		4,603	25' x length of t/c
Baggage Claim Area	1,074	PHTP	9.00	SF/PHTP	376	9,666	80' x 40' /device
Baggage Claim Frontage	1,074	PHTP	0.35	LF/PHTP			3 devices
Baggage Service Office	1,074	PHTP	0.84	SF/PHTP		900	3 offices
Outbound Baggage	1,083	PHOP	11.05	SF/PHOP		11,967	65' x length of t/c
Inbound Baggage	1,074	PHTP	7.00	SF/PHTP		7,518	80' x 30' /device
Airline Operations	2,127,581	ANNEP	0.005	SF/ANNEP		10,000	planning est.
Departures Lounges (Holdrooms)	11	Gates				19,350	total lounge area
B757-200	2	Gates	2,250	SF/gate		4,500	
A320	5	Gates	2,050	SF/gate		10,250	
B737-700	1	Gates	1,750	SF/gate		1,750	
CRJ-700	3	Gates	950	SF/gate		2,850	
<b>Subtotal Airline Functions</b>						<b>68,693</b>	
<b>Concessions</b>							
Concessions (food/ bev/ sundry)	2,127,581	ANNEP	0.0100	SF/ANNEP		21,276	
Concessions storage	2,127,581	ANNEP	0.0020	SF/ANNEP		4,255	
<b>Subtotal Concessions</b>						<b>25,531</b>	
<b>Secure Public Area</b>							
Passenger Screening Checkpoint	7	Lanes	1,300	SF/Lane		9,100	13' x 100' / lane
Concourse Circulation	11	Gates	1,500	SF/Gate		16,500	20' wide
Restrooms	1,828	PHP	3.00	SF/PHP		5,484	3 sets M/F
Other	2,127,581	ANNEP	0.0010	SF/ANNEP		2,128	miscellaneous
<b>Subtotal Secure Public Area</b>						<b>33,212</b>	
<b>Non-Secure Public Area</b>							
Circulation - Ticketing	1,083	PHOP	5.10	SF/PHOP		5,523	30' x width of t/c
Circulation - Baggage Claim	1,074	PHTP	7.00	SF/PHTP		7,518	30' x width of b/c
Circulation - General			10.0%	Of Total SF		24,374	planning est.
Restrooms	1,828	PHP	2.00	SF/PHP		3,656	2 sets M/F
Other	2,127,581	ANNEP	0.0010	SF/ANNEP		2,128	miscellaneous
<b>Subtotal Non-Secure Public Area</b>						<b>43,199</b>	
<b>Non-Public Area</b>							
EDS/ TSA	1,083	PHOP	8.84	SF/PHOP		9,574	planning est.
Airport Administration			4.0%	Of Total SF		9,750	planning est.
Loading Dock	1	Dock	800	SF/Dock		800	planning est.
Restrooms	3	Sets	600	SF/Set		1,800	3 sets M/F
Circulation			4.0%	Of Total SF		9,750	planning est.
Maintenance and Storage			2.0%	Of Total SF		4,875	planning est.
Mechanical/ Electrical			10.0%	Of Total SF		24,374	planning est.
Other			5.0%	Of Total SF		12,187	miscellaneous
<b>Subtotal Non-Public Area</b>						<b>73,110</b>	
<b>Total Functional Area</b>						<b>243,745</b>	

Source: HNTB analysis

SF = Square Feet; LF = Linear Feet

PHOP = Peak Hour Originating Passengers; PHTP = Peak Hour Terminating Passengers

PHP = Peak Hour Passengers; ANNEP = Annual Enplaning Passengers

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Table 2

## LONG BEACH AIRPORT

## Passenger Terminal Facility Requirements - Scenario 2

Description	Demand Level		Planning Factor		LF	SF	Comments
<b>Airline Functions</b>							
Ticket Counter Area	1,083	PHOP	1.78	SF/PHOP	184	1,928	10.5' x length of t/c
Ticket Counter Length	1,083	PHOP	0.17	LF/PHOP			
Ticket Counter Queuing	1,083	PHOP	2.55	SF/PHOP		2,762	15' x length of t/c
Airline Ticket Office	1,083	PHOP	4.25	SF/PHOP	415	4,603	25' x length of t/c
Baggage Claim Area	1,187	PHTP	9.00	SF/PHTP		10,683	80' x 40' /device
Baggage Claim Frontage	1,187	PHTP	0.35	LF/PHTP			3 devices
Baggage Service Office	1,187	PHTP	0.84	SF/PHTP		995	3 offices
Outbound Baggage	1,083	PHOP	11.05	SF/PHOP		11,967	65' x length of t/c
Inbound Baggage	1,187	PHTP	7.00	SF/PHTP		8,309	80' x 30' /device
Airline Operations	2,522,015	ANNEP	0.005	SF/ANNEP		11,853	planning est.
Departures Lounges (Holdrooms)	13	Gates				23,150	total lounge area
B757-200	2	Gates	2,250	SF/gate		4,500	
A320	6	Gates	2,050	SF/gate		12,300	
B737-700	2	Gates	1,750	SF/gate		3,500	
CRJ-700	3	Gates	950	SF/gate		2,850	
<b>Subtotal Airline Functions</b>						<b>76,249</b>	
<b>Concessions</b>							
Concessions (food/ bev/ sundry)	2,522,015	ANNEP	0.0100	SF/ANNEP		25,220	
Concessions storage	2,522,015	ANNEP	0.0020	SF/ANNEP		5,044	
<b>Subtotal Concessions</b>						<b>30,264</b>	
<b>Secure Public Area</b>							
Passenger Screening Checkpoint	7	Lanes	1,300	SF/Lane		9,100	13' x 100' / lane
Concourse Circulation	13	Gates	1,500	SF/Gate		19,500	20' wide
Restrooms	1,867	PHP	3.00	SF/PHP		5,601	3 sets M/F
Other	2,522,015	ANNEP	0.0010	SF/ANNEP		2,522	miscellaneous
<b>Subtotal Secure Public Area</b>						<b>36,723</b>	
<b>Non-Secure Public Area</b>							
Circulation - Ticketing	1,083	PHOP	5.10	SF/PHOP		5,523	30' x width of t/c
Circulation - Baggage Claim	1,187	PHTP	7.00	SF/PHTP		8,309	30' x width of b/c
Circulation - General			10.0%	Of Total SF		27,000	planning est.
Restrooms	1,867	PHP	2.00	SF/PHP		3,734	2 sets M/F
Other	2,522,015	ANNEP	0.0010	SF/ANNEP		2,522	miscellaneous
<b>Subtotal Non-Secure Public Area</b>						<b>47,088</b>	
<b>Non-Public Area</b>							
EDS/ TSA	1,083	PHOP	8.84	SF/PHOP		9,574	planning est.
Airport Administration			4.0%	Of Total SF		10,800	planning est.
Loading Dock	1	Dock	800	SF/Dock		800	planning est.
Restrooms	3	Sets	600	SF/Set		1,800	3 sets M/F
Circulation			4.0%	Of Total SF		10,800	planning est.
Maintenance and Storage			2.0%	Of Total SF		5,400	planning est.
Mechanical/ Electrical			10.0%	Of Total SF		27,000	planning est.
Other			5.0%	Of Total SF		13,500	miscellaneous
<b>Subtotal Non-Public Area</b>						<b>79,673</b>	
<b>Total Functional Area</b>						<b>269,998</b>	

Source: HNTB analysis

SF = Square Feet; LF = Linear Feet

PHOP = Peak Hour Originating Passengers; PHTP = Peak Hour Terminating Passengers

PHP = Peak Hour Passengers; ANNEP = Annual Enplaning Passengers

Table 3

## LONG BEACH AIRPORT

## Passenger Terminal Facility Requirements Comparison

Description	Scenario 1 Requirements from Table 1		Scenario 2 Requirements from Table 2		Approximate Existing Areas		Comments on Existing Areas
	No./LF	SF	No./LF	SF	No./LF	SF	
<b>Airline Functions</b>							
Ticket Counter Area		1,928		1,928		1,250	
Ticket Counter Length	184		184		140		
Ticket Counter Queuing		2,762		2,762		1,400	
Airline Ticket Office		4,603		4,603		4,360	includes Airline Operations
Baggage Claim Area		9,666		10,683		4,380	exterior covered space
Baggage Claim Frontage	376		415		215		two claim devices
Baggage Service Office		900		995		0	
Outbound Baggage		11,967		11,967		10,400	includes EDS/TSA
Inbound Baggage		7,518		8,309		3,400	exterior covered space
Airline Operations		10,000		11,853		0	included in ATO
Departures Lounges (Holdrooms)	11	19,350	13	23,150	8	12,850	three holdroom buildings
B757-200	2	4,500	2	4,500	2		
A320	5	10,250	6	12,300	4		
B737-700	1	1,750	2	3,500	1		
CRJ-700	3	2,850	3	2,850	1		
<b>Subtotal Airline Functions</b>		<b>68,693</b>		<b>76,249</b>		<b>38,040</b>	
<b>Concessions</b>							
Concessions (food/ bev/ sundry)		21,276		25,220		5,460	
Concessions storage		4,255		5,044		0	
<b>Subtotal Concessions</b>		<b>25,531</b>		<b>30,264</b>		<b>5,460</b>	
<b>Secure Public Area</b>							
Passenger Screening Checkpoint		9,100		9,100		5,900	two checkpoints
Concourse Circulation		16,500		19,500		2,450	
Restrooms		5,484		5,601		3,200	
Other		2,128		2,522		0	
<b>Subtotal Secure Public Area</b>		<b>33,212</b>		<b>36,723</b>		<b>11,550</b>	
<b>Non-Secure Public Area</b>							
Circulation - Ticketing		5,523		5,523		1,400	
Circulation - Baggage Claim		7,518		8,309		4,200	exterior covered space
Circulation - General		24,374		27,000		10,140	includes exterior space
Restrooms		3,656		3,734		1,330	
Other		2,128		2,522		0	
<b>Subtotal Non-Secure Public Area</b>		<b>43,199</b>		<b>47,088</b>		<b>17,070</b>	
<b>Non-Public Area</b>							
EDS/ TSA		9,574		9,574		0	included in Outbound Baggage
Airport Administration		9,750		10,800		6,970	
Loading Dock		800		800		0	
Restrooms		1,800		1,800		430	
Circulation		9,750		10,800		4,100	
Maintenance and Storage		4,875		5,400		3,700	
Mechanical/ Electrical		24,374		27,000		1,570	
Other (chases, structure, etc.)		12,187		13,500		3,200	
<b>Subtotal Non-Public Area</b>		<b>73,110</b>		<b>79,673</b>		<b>19,970</b>	
<b>Total Functional Area</b>		<b>243,745</b>		<b>269,998</b>		<b>92,090</b>	includes 30,130 SF of exterior space

Source: HNTB analysis

SF = Square Feet; LF = Linear Feet

Table 4

## LONG BEACH AIRPORT

## Passenger Terminal Improvements -- Facility Comparison

Description	Existing Facilities Including Temporary Modular Buildings	Calculated Facility Requirements (Forecast Scenario 1)	Proposed Project 9/22/03 (note 1)	Recommended Facility Program
<b>Holdrooms</b>				
Departure lounges	12,850 sq. ft.	19,350 sq. ft.		14,750 sq. ft. (note 2)
Circulation	4,350 sq. ft.	16,500 sq. ft.		8,500 sq. ft. (note 3)
Restrooms	2,450 sq. ft.	5,484 sq. ft.		3,200 sq. ft. (note 4)
<b>Total</b>	<b>19,650 sq. ft.</b>	<b>41,334 sq. ft.</b>	<b>20,000 sq. ft.</b>	<b>26,450 sq. ft.</b>
			Existing <b>6,500 sq. ft.</b>	Existing <b>6,500 sq. ft.</b>
			Total <b>26,500 sq. ft.</b>	Total <b>32,950 sq. ft.</b>
<b>Passenger Security Screening</b>	<b>5,900 sq. ft.</b>	<b>9,100 sq. ft.</b>	<b>6,000 sq. ft. (note 5)</b>	<b>10,000 sq. ft.</b>
<b>Concession Area</b>	<b>5,460 sq. ft.</b>	<b>25,531 sq. ft.</b>	<b>8,000 sq. ft.</b>	<b>20,000 sq. ft.</b>
			Existing <b>5,460 sq. ft.</b>	Existing <b>5,460 sq. ft.</b>
			Total <b>13,460 sq. ft.</b>	Total <b>25,460 sq. ft.</b>
<b>Baggage Security Screening</b>	<b>5,000 sq. ft.</b>	<b>9,574 sq. ft.</b>	<b>7,000 - 10,000 sq. ft.</b>	<b>7,000 - 10,000 sq. ft.</b>
<b>Baggage Claim Devices</b>				
Passenger side	226 lin. ft.	376 lin. ft.	380 lin. ft.	510 lin. ft. (note 6)
Airline loading side	180 lin. ft.	240 lin. ft.	230 lin. ft.	310 lin. ft. (note 6)
<b>Total</b>	<b>406 lin. ft.</b>	<b>616 lin. ft.</b>	<b>610 lin. ft.</b>	<b>820 lin. ft. (note 6)</b>
<b>Baggage Service Office</b>	<b>0 sq. ft.</b>	<b>900 sq. ft.</b>	<b>825 sq. ft.</b>	<b>900 sq. ft.</b>
<b>Restrooms (non-secure)</b>	<b>1,330 sq. ft.</b>	<b>3,656 sq. ft.</b>	<b>850 sq. ft.</b>	<b>2,000 sq. ft. (note 7)</b>
<b>Multi-purpose rooms</b>	<b>0 sq. ft.</b>	<b>0 sq. ft.</b>	<b>300 sq. ft.</b>	<b>300 sq. ft.</b>
<b>Office Space</b>				
TSA	3,600 sq. ft.	13,500 sq. ft.		13,500 sq. ft.
Airlines (operations offices)	2,000 sq. ft.	10,000 sq. ft.		10,000 sq. ft.
Airport (offices and conference)	6,970 sq. ft.	9,750 sq. ft.		5,000 sq. ft.
<b>Total</b>	<b>12,570 sq. ft.</b>	<b>33,250 sq. ft.</b>	<b>20,000 sq. ft.</b>	<b>28,500 sq. ft.</b>
<b>Ticketing Facilities</b>				
Ticket counter area	1,250 sq. ft.	1,928 sq. ft.		680 sq. ft.
Ticket counter queuing	1,400 sq. ft.	2,762 sq. ft.		1,400 sq. ft.
Circulation -- ticketing	1,400 sq. ft.	5,523 sq. ft.		4,100 sq. ft.
<b>Total</b>	<b>4,050 sq. ft.</b>	<b>10,213 sq. ft.</b>		<b>6,180 sq. ft.</b>
				Existing <b>4,050 sq. ft.</b>
				Total <b>10,230 sq. ft.</b>
<b>Aircraft Gates</b>	<b>8</b>			<b>11 (note 8)</b>
<b>Aircraft Parking Positions</b>	<b>10</b>		<b>16</b>	<b>16 (note 9)</b>

## Notes:

1. Long Beach Airport Terminal Improvements EIR, Notice of Preparation and Scoping, September 22, 2003, City of Long Beach.

2. Based on departure lounge sizes as follows: 2 B757 @ 2,250 sq. ft.; 5 A320 @ 2,050 sq. ft.; 1 B737-700 @ 1,750 sq. ft.; and 3 CRJ-700 @ 950 sq. ft.; minus 4,600 sq. ft. of existing holdroom building departure lounge.

3. Based on a circulation corridor approximately 500 feet long with an average width of 20 feet, along one side of the departure lounges; minus 1,100 sq. ft. of existing holdroom building circulation area.

4. Based on two sets of Men/Women restrooms, each set approximately 1,600 square feet including janitor closets and vestibules; these restrooms supplement the existing 800 sq. ft. of restrooms in the existing holdroom building.

5. Not including passenger queuing space.

6. Based on a probable split baggage claim configuration (2 claim units on the south side and 2 claim units on the north side) rather than a consolidated baggage claim area (3 claim units on the south side) assumed in the calculated facility requirements.

7. Based on two sets of Men/Women restrooms, each set approximately 1,000 square feet including janitor closets and vestibules; these supplement existing 1,300 sq. ft. of non-secure restrooms.

8. Based on 2 B757-size positions; 6 A320 or B737-size positions; and 3 regional jet positions.

9. Based on 4 B757-size positions; 8 A320 or B737-size positions; and 4 regional jet positions.

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